
External Evaluation

March 27, 2006

Graduate Program in

“Cellular and Genetic Etiology, Diagnosis and Treatment of Human Disease”

Medical School, University of Crete, Heraklion

Committee Report

A. Introduction

The goal of this graduate program is two-fold: to train physicians in the fundamentals of biomedical research, so that they may become leaders in academic medicine; and to train biologists, biochemists, and other basic scientists in the medical sciences, so that they can apply their skills to problems of human disease in their subsequent careers in biomedical research. The program, including a list of current students and faculty, the courses and schedules, lecture materials, papers, and announcements are described on the internet at: <http://www.molmedgp.med.uoc.gr/>

The program began in the academic year 2003-2004 and is currently in its third year of operations. Students in the program can obtain a Master's degree or a Ph.D. The program is unique and innovative, and complements two existing graduate programs at the University, one in neurosciences and one in molecular biology and biomedicine.

The program review took place on March 27, 2006, on site at the University of Crete. The review included examination of course materials, student applications and program critiques, and faculty Curricula Vitae; meetings with the program directors, faculty, students, and university administration (Rector and Dean); and research presentations by students in the program (oral and posters). The review was intended to evaluate the facilities, resources, and support available to the program; organization and administration of the program; the quality of the faculty participating in the program; the quality of the students; and the structure and content of the courses and research opportunities available to the students.

B. Facilities

The laboratories and classrooms are sited in the recently constructed buildings of the Medical School of the University of Crete in Heraklion. These facilities are spacious and modern and have all the necessary technological facilities for the performance of molecular and cellular biomedical research, including access to DNA sequencing, flow cytometry, confocal microscopy, cell culture equipment, polymerase chain reactors, *etc.* The first round of funding for the program provided support for needed equipment items, although unfortunately support was delayed, but these have now been purchased.

According to the Dean, a new building for postgraduate education is planned. Nearby are the University Hospital, Schools of Biology, Physics, and Chemistry, and the Institute of Molecular Biology and Biotechnology of the Foundation for Research and Technology. These provide a rich environment for biomedical education.

Recommendations: The committee was impressed by the well-equipped research laboratories in the Department of Internal Medicine. One deficiency that was identified by the students was inadequate numbers of computers to access the internet and on-line journals. Although there is a room for video-conferencing and computing, access to it is limited. The students need to have around-the-clock availability of computer and electronic information technology. While there are plans for additional facilities in the new building, it is critical to address this as soon as possible. It would be appropriate to request funds for this in the new application to the government or through other funding sources. One way to increase internet access is with wireless networking, which can be done on a building or even campus-wide basis. Additionally, there will be needs for periodic upgrading of other laboratory equipment for use by trainees in the program, and support for this is appropriate in the future.

C. Program Faculty and Administration

The program faculty primarily comes from the departments of the University of Crete. The faculty appears to be very committed to the program and to the students. Their background, training, and preparation for teaching biomedical sciences is generally excellent. Some courses are also supported by visiting faculty from other institutions, expert in a particular field (*e.g.* in the course of Immunity and Infection). Currently there is no compensation for teaching.

The Program is directed by Dimitrios T. Boumpas, MD, FACP, Professor of Medicine and Director, Internal Medicine/Rheumatology, Clinical Immunology and Allergy. Dr. Boumpas is clearly dedicated to the success of the program and to the

training and career development of the students in it. He is assisted by the Associate Director Dimitrios Kardassis, PhD. Dr. Kardassis is a course director and maintains the website. The program is governed by a Coordinating Committee that also includes, Vassilis Zannis PhD. Dr. Zannis, an adjunct faculty member from Boston University School of Medicine, USA, has a distinguished record of teaching there and in the combined Harvard-M.I.T. program in Health, Science, and Technology. Dr. Zannis directs the course in molecular medicine.

Recommendations: The Review Committee found the members of the Coordinating Committee and key teaching faculty to be superb scientists and teachers, who are highly dedicated to the success of the Program. The high quality of Program faculty should be maintained by continuing to utilize top basic and clinical faculty with active research programs to teach in the Program. In addition, we encourage the Coordinating Committee of the Program to continue to recruit faculty from other universities and collaborating institutions in Greece and from around the world. Although this adds to the operating expenses of the program, it provides a unique national and international perspective on science for the students. It is also a superb way to advertise the research and training activities of the University of Crete to other scientists and other institutions, and is likely to lead to productive collaborations and interactions in the future. In the new application, allocation of funds to support expenses for visiting faculty should be a priority.

One deficiency in the Program is that the process of mentoring the students is somewhat informal, overseen on an *ad hoc* basis primarily by members of the Coordinating Committee. The students might benefit from a more formalized system,

in which they are assigned to a faculty member who is an active participant in the program and experienced in graduate training, who would assist them with planning their courses and research, and with career development.

The students also felt that there was a lack of interaction between the senior students working in labs, and the junior students taking courses. This can be rectified in a number of ways, including having senior students paired with junior students for mentoring and by having more Program activities like journal clubs as well as social activities.

D. Organization and content of courses

The formal coursework takes place in the first seven months of the Graduate Program. The courses offered cover 260 hours and are divided into five required core courses covering 130 hours, and six elective courses covering 130 hours. The total number of hours that are required is 200, thus, the students choose 70 hours of the 130 hours of elective courses offered, providing a good menu of choice. Because the background of the students is quite variable, the first few weeks in the fall are devoted to training the basic scientists in the terminology and basic concepts of clinical medicine, and training the MDs in principles of molecular and cell biology.

After formal courses are completed, the students choose two laboratory rotations for the balance of the first year. The second year is devoted to research and preparation of the Master's thesis. The top students are then eligible to take a qualifying examination and continue with research for a PhD, requiring an additional three to five years.

Recommendations: The spectrum of courses is diverse. Some courses are very thorough (e.g. “Interdisciplinary Approach to the Molecular, Cellular and Genetic Basis of Human Disease”, “Immunity and Infection”) while others continue to evolve in response to an annual internal review process that includes input from the students (e.g. “Pathophysiology” was replaced by a new course “The Pathologic Basis of Human Diseases”). This ongoing annual review of the course requirements and content is essential, as courses should change over time depending upon the needs of the students and the goals and interests of the program faculty. The External Review Committee recommends that the course on immunology be required. Other topics that might be considered, if appropriate faculty can be identified, include electives in vascular and endothelial biology, cardiovascular disease, or gene and cellular therapies. Analytical principles in biochemistry, immunology and microbiology, and in microscopy should be covered in the course “Introduction to Basic Research Methodology”.

The Review Committee solicited input from the students privately about the courses and faculty. Overall, they were remarkably happy with the training they are receiving. They did remark that some courses that have multiple lecturers are not well-coordinated. This can be rectified by having the course director review the content of the lectures, and where necessary, provide introductory materials. They also felt that some of the examinations were overly long and required too much memorization. At the graduate level, examinations should strive to focus on critical analysis of current literature and on creative thinking. The Program Coordinating Committee was aware of these concerns through the internal review process, and is working to address them.

E. Students

This Program is receiving an increasing number of applications. Less than half of the applicants are interviewed, and about half of those interviewed are accepted. Thus the Program can be highly selective and can take top students, about 20-25% of those who apply. The Program strives to admit equal numbers of students with MD degrees and BS degrees, and was able to achieve this goal after the first year of operation. Of 10-12 students per year, only about three can be supported by fellowships given the current resources of the Program and the limitations imposed by the granting agency, the Ministry of Education. The lack of financial support was a major concern of the students.

Recommendations: The Review Committee was extremely impressed with the quality of the students. They are enthusiastic about their research training. The quality of their oral and poster presentations to their colleagues and the Review Committee were outstanding. They describe the Program as “the best option in Greece for those with a medical degree to gain knowledge in biomedical research” and a way for physicians to “bring information from the clinic back to the bench”. However, the availability of fellowship support for only about a quarter of the students is a serious obstacle to the success of the Program. Funding should be sought in from the government, as well as from non-governmental sources including donations, foundations, and the pharmaceutical industry, with the goal of eventually providing fellowship support to all of the postgraduate students.

Efforts should continue to be made to maintain the balance of MDs and BS matriculants. This is essential to meet the goals of both training scientists who can apply their skills to medical problems, and of training physician-researchers that will be the leaders in academic medicine in Greece in the future. The fact that many of the students continue on to do PhD research is an important measure of the success of the Program.

F. Conclusion

This is a unique graduate program that seeks to train physician-scientists and academic leaders for Greek medicine in the future. The External Review Committee was extremely impressed with the quality of the Program: the faculty is dedicated to its success; the students are outstanding; and the courses and training that are offered are excellent. Minor modifications in course, policies, and resources as recommended will further improve the Program. We recommend the Program for continued support by the Ministry of Education. Furthermore, key to its continued success is additional funding in three areas: firstly, to expand the fellowship support for the students, so they can pursue their training with financial assistance; secondly, to support the expenses of external visiting faculty; and thirdly, to expand access to computers and information technologies that are required for modern biomedical research. In addition, financial support for laboratory supplies or bench fees would help defray the cost of research training of the students. Also, there will be ongoing equipment needs for the Program to stay current. It is essential that financial support for the program be

available in a timely fashion, to not interrupt the training and recruitment of the students. In addition to full financial support, the program would benefit from flexibility in how resources can be reallocated as needed to support the students, visiting faculty, and programs.

If the Program continues to flourish and expand, it will be successful in serving as a source of future outstanding scientists and faculty in medicine and related basic biomedical sciences, and it will continue to further the reputation of the Medical School of the University of Crete as a unique and outstanding research-oriented medical school.

External Evaluation Committee Members



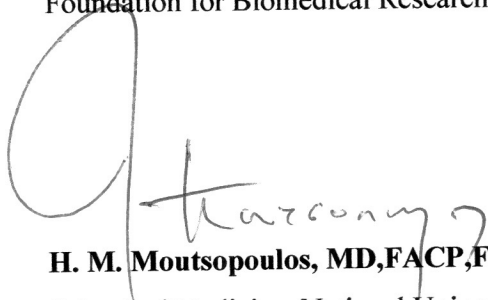
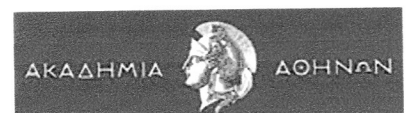
David C. Seldin, MD, PhD, Chair

Boston University School of Medicine, Boston MA



Y. Capetanaki, PhD, Ad hoc Member

Foundation for Biomedical Research of the Academy of Athens



H. M. Moutsopoulos, MD, FACP, FRCP, Regular Member

School of Medicine, National University of Athens





K. Sekeris, MD, Ad hoc Member

School of Medicine, National University of Athens



ΕΘΝΙΚΟΝ & ΚΑΠΟΔΙΣΤΡΙΑΚΟΝ
ΠΑΝΕΠΙΣΤΗΜΙΟΝ ΑΘΗΝΩΝ



O. Tsolas, PhD, Ad hoc Member

School of Medicine,
University of Ioannina

